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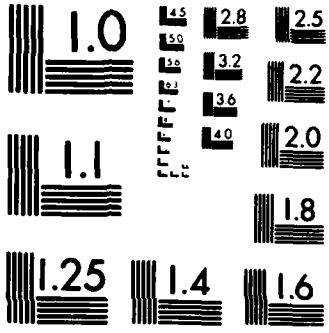

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HISTORY OF THE DEVELOPMENT OF AVIATION MACHINEGUNS IN THE USSR

by

Chen Bincai

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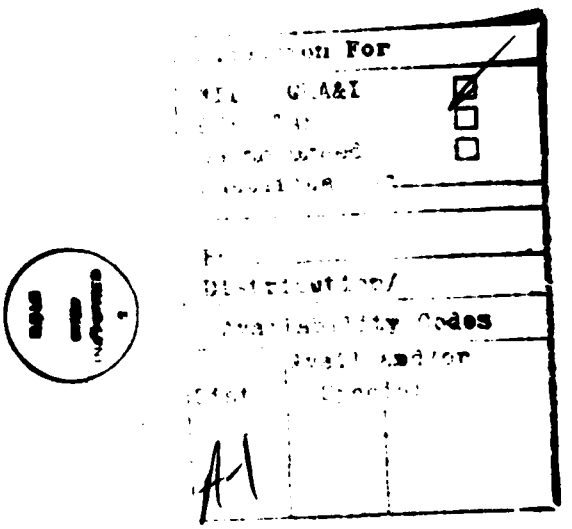

HISTORY OF THE DEVELOPMENT OF AVIATION MACHINEGUNS IN THE USSR

Chen Bincai

Before the October Revolution, the Tsar of Russia did not have specific automatic weapons for aviation because it was still in its infancy. Before the mid-1920's, the young Soviet government did not have any time to develop new weapons because of war. Once the war ended, the Russian government took effective measures to develop new weapons for the air force.

In 1929, weapon designer Zhegezhliefu* developed the ПА aviation machinegun based on the ПП machine he had developed earlier for the army. This was Russia's first aviation automatic weapon.

Another weapon designer, Natashi Kayeykiy, developed the ПВ aviation machinegun from the Markson machinegun. The gun only weighed 14.5 kg and the firing rate was 780 rounds/minute.

Until the late 20's, the USSR only had these two types of aviation automatic weapons.

In the 30's, the speed and survivability of airplanes improved drastically. Airplane tubular frames and total metal skins could withstand more bullet holes. The availability of air-cooled engines also improved the survivability of engines. Other things included the self-sealing rubber fuel tank and the inert gas filling system to prevent fuel tanks from catching fire.

One way to increase the attack power is to enlarge the caliber of the weapon. However, as the caliber increases, so do the recoil force and weight. The firing velocity will be decreased. These unfavorable factors present many difficulties in the development of

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*Translator's note: Russian names are transliterated from the Chinese.

large caliber weapons. Hence, the concept of a "recoilless gun" was introduced, i.e., the gas produced by the charge is blasting toward the rear to cancel the recoil force. Based on this new concept, Kuergiefusizhi designed the APK recoilless machinegune. The APK gun was put in small batch production. During the testing process, some accidents and casualties resulted. A series of tests continued; however, the problem still could not be solved. In 1936, the development of recoilless guns was terminated.

As the Russians were developing recoilless guns, they did not give up the development of high firing rate aviation machineguns.

In the 30's, the Shihitaernai Weapons Development Bureau designed the ShKAS high firing rate aviation machinegun based on the French "Beitiai" machinegun. The first production model was introduced in 1933. It was batch produced in 1935. In 1944 alone, 40,000 were manufactured. The ShKAS machinegun broke the firing rate record of light machineguns in the world.

Soon after, the first USSR aviation machinegun--ShBAK was developed based on the ShKAS machinegun. In 1933, French experts had helped the Russians in the development of the ShBAK machinegun.

The ShKAS and ShBAK machineguns were used in World War II.

In the late 30's, the Russians developed the UB universal aviation machinegun based on the Finnish "Lati" machinegun. It could be installed on a rotating tower as well as on the wing. It could also be fired through the propeller in a synchronized manner. It was a good performance weapon. In 1944 alone, 60,000 were made.

In 1941, the VYa machinegun was developed by the Russians based on the principle of the Lati machinegun. This gun had a high initial velocity capable of penetrating 25 mm of armor at a specific distance.

In the same year, Nuderman and Sulanuofu developed the HC-37 aviation machinegun. It was equipped with blasting and armor piercing shells, capable of destroying targets in the air and on the ground. The maximum armor piercing thickness was 40 mm.

In World War II, the 45 mm caliber HC-45 machinegun was developed on the basis of the HC-37. This gun was installed on aircraft such as Yak-9K and TU-2.

Designers also developed a 57 mm caliber aviation machinegun. It was installed on TU-2 aircraft. Experience showed that aviation machineguns of this caliber were not practical.

The B-20 machinegun developed during the war was a pneumatic aviation automatic weapon. Soon after the B-20 was used, World War II ended. After the war, the B-20 was used as a defensive weapon on bombers.

In 1945, the HC-23 machinegun replaced the BYa machinegun. When compared to BYa, the weight of HC-23 was reduced by one-half despite the fact that the initial speed and firing rate were reduced somewhat.

In 1946, the H-37 machine gun replaced the HC-37. The H-37 and HC-23 were basic weapons on early Russian jet fighters, such as the MIG 9 and MIG 15.

In the late 40's, the USSR developed the HP-23 machinegun. Many revolutionary measures were taken in the structure of this gun. For example, an advancing accelerator arm was used to increase the firing rate. The HP-23 machinegun was the major weapon on Russian fighters.

In the mid-50's, the USSR developed the HP-30 machinegun. The HP-30 is the same as the H-23 in principle. However, several improvements were made to raise the tactical capability. The HP-30

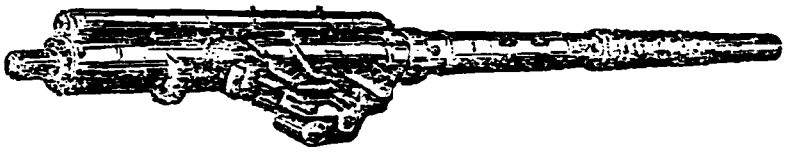

Figure 1. The H-37 aviation gun

Figure 2. The HP-23 aviation gun

machineguns were primarily installed on fighters built after the 50's.

The AM-23 machine gun, which began to serve in 1954, is a pneumatically operated weapon. Because measures such as a lever feeder and a gas buffer were used, the firing rate was increased. The AM-23 is used as a defensive weapon for bombers.

Russian weapon designers claimed that the HP-30 and AM-23 had exhausted all the classical potentials in automatiac weapons for variation. The next step should involve weapons based on new principles.

The GSh-23 machinegun, which began to serve in the late 60's, was a new automatic weapon used in aviation. It adopted the double bore synchronized rear loading principle to increase the firing rate and reduce gun weight.

In the mid-70's, the USSR developed a 23 mm caliber Kalinte type six-bore aviation machinegun. It is very similar to the US M61 six-bore gun.

Soon after, the USSR also developed a 30 mm caliber six-bore machinegun. It is estimated that the structure and performance of

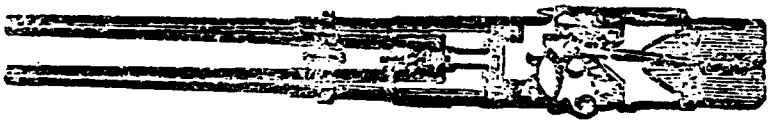

Figure 3. The AM-23 double-bore aviation gun

Figure 4. The HP-30 aviation gun

this gun are very similar to those of the GAU-8/A seven-bore gun developed by the USA. This large caliber six-bore gun may have not been perfected yet.

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